
3D printing of functional biomaterials for tissue engineering.

Journal: Curr Opin Biotechnol

Publication Year: 2016

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PubMed link: 27043763

Funding Grants: Development of 3D Bioprinting Techniques using Human Embryonic Stem Cells Derived Cardiomyocytes for Cardiac Tissue Engineering

Public Summary:

3D printing is emerging as a powerful tool for tissue engineering by enabling 3D cell culture within complex 3D biomimetic architectures. In this review, we discuss the prevailing 3D printing techniques and their most recent applications in building tissue constructs. The work associated with relatively well-known inkjet and extrusion-based bioprinting is presented with the latest advances in the fields. Emphasis is put on introducing two relatively new light-assisted bioprinting techniques, including digital light processing (DLP)-based bioprinting and laser based two photon polymerization (TPP) bioprinting. 3D bioprinting of vascular network is particularly discussed for its foremost significance in maintaining tissue viability and promoting functional maturation. Limitations to current bioprinting approaches, as well as future directions of bioprinting functional tissues are also discussed. This review intends to provide a broad view of 3D bioprinting techniques.

Scientific Abstract:

3D printing is emerging as a powerful tool for tissue engineering by enabling 3D cell culture within complex 3D biomimetic architectures. This review discusses the prevailing 3D printing techniques and their most recent applications in building tissue constructs. The work associated with relatively well-known inkjet and extrusion-based bioprinting is presented with the latest advances in the fields. Emphasis is put on introducing two relatively new light-assisted bioprinting techniques, including digital light processing (DLP)-based bioprinting and laser based two photon polymerization (TPP) bioprinting. 3D bioprinting of vasculature network is particularly discussed for its foremost significance in maintaining tissue viability and promoting functional maturation. Limitations to current bioprinting approaches, as well as future directions of bioprinting functional tissues are also discussed.

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